Sea Ice Machine Learning

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TOC

About Me

- Stay-at-home mom for the past 8 years
- Nursery Teacher for local church
- Elementary Aide
- Daycare Teacher

Why Sea Ice?

1. Since I was little I have had a love for penguins.
2. The melting Sea Ice is concerning for all of us, especially those who live in low elevation areas.
3. Sea ice holds many things we don't know about. Viruses is a main threat.
4. Animals live on the Sea Ice and we need to protect their habitat.

About the data

The data came from NASA Earth Sciences- Goddard Earth Sciences Division Projects. The data consisted of 12 individual files that ranged from February-March ‘04 to October-November ‘07. There were 5 columns in each file that had Time (UTC since Jan. 1, 2000), Latitude, Longitude, Sea Ice Freeboard and Sea Ice Thickness.

About the data

I had to make a couple changes to the data so that it would be easier to read. None of the data was missing any but the time, latitude and longitude where all in different formats.

01 | Added the .txt files to R and made the two groups

02 | Saved the groups from R to my computer as csv file

03 | Uploaded the groups into Python

04 | Changed the time to the month, day year format

05 | Worked on changing with latitude and longitude

To see the code go to:

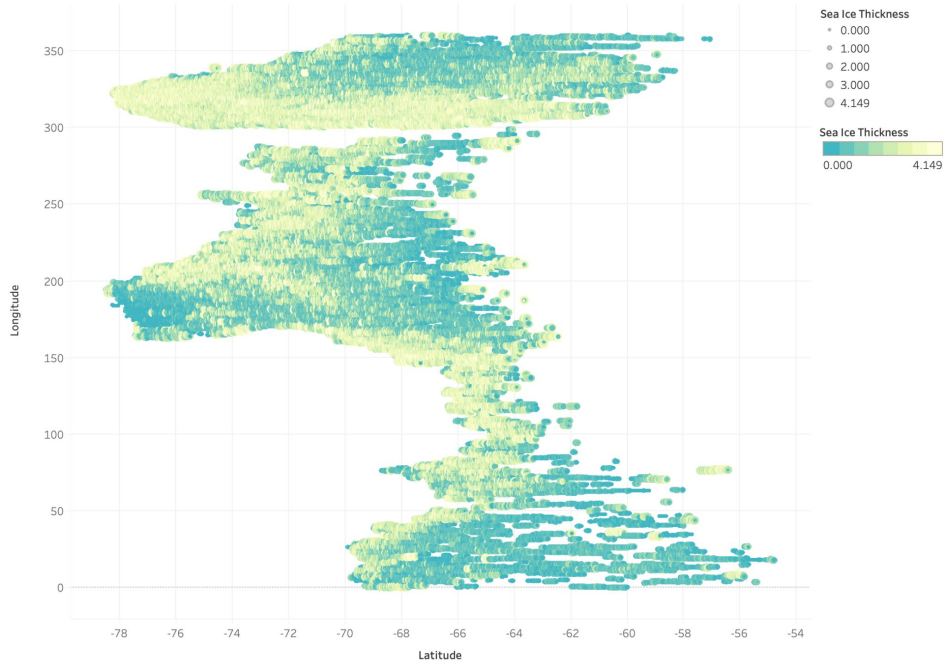
https://github.com/Rhoadeskl/Final-Project

Where is the sea ice loss at?

Using the data available can we see where the sea ice loss is the greatest? Using the latitude and longitude we can see where the sea ice is thinning most. Over the next couple slides we can see where this is happening.

Sea Ice Thickness

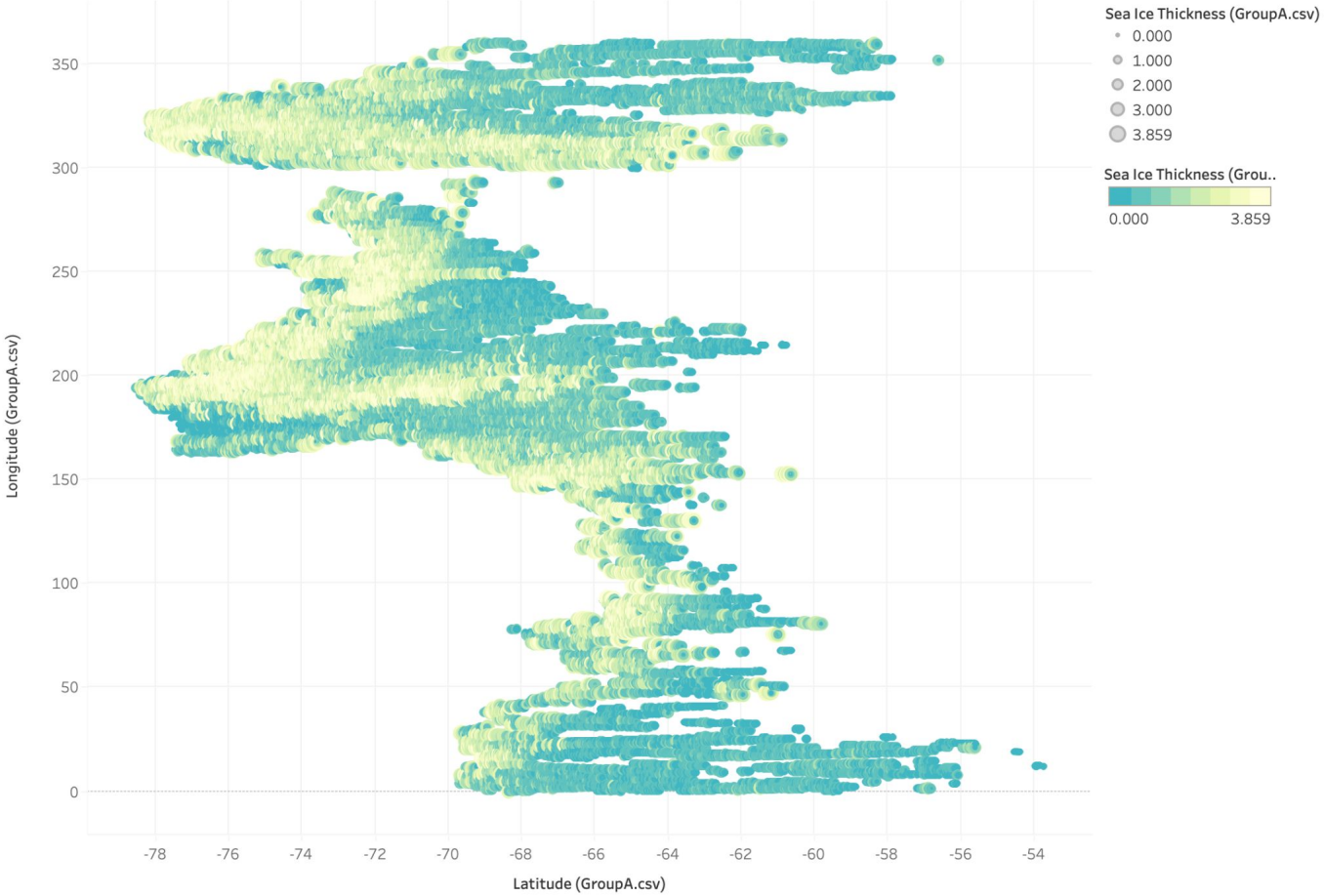
Group Sea Ice Thickness



GroupA Sea Ice Thickness

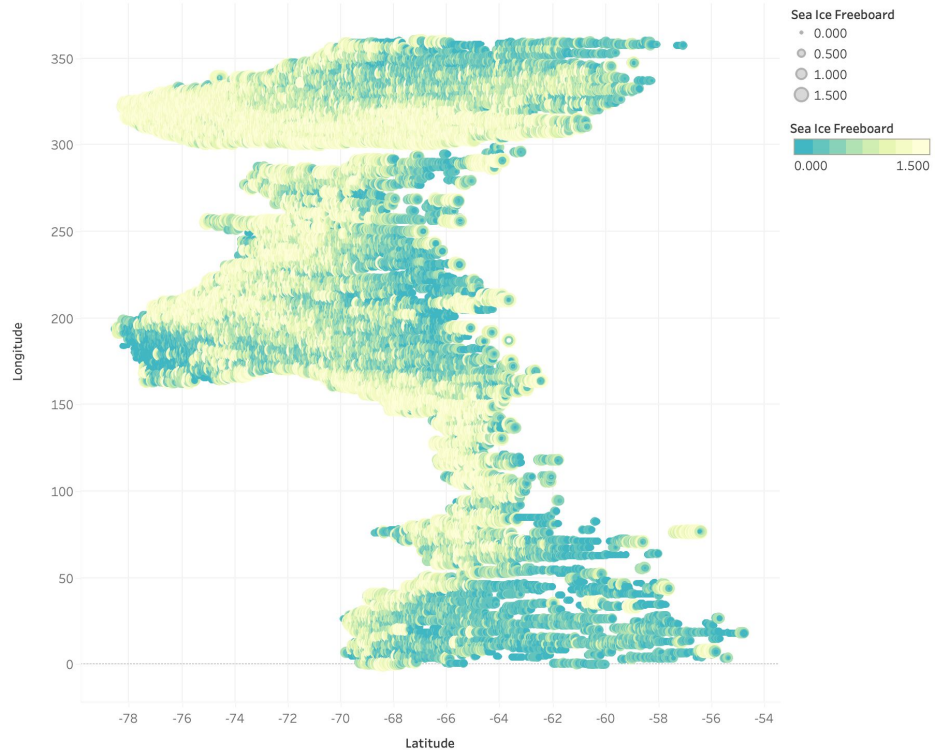

Group Sea Ice Thickness
Sea Ice Thickness
0.000
1.000
2.000
3.000
4.149
Sea Ice Thickness
0.000
4.149
Longitude
350
300
250
200
150
100
50
0
-78
-76
-74
-72
-70
-68
-66
-64
-62
-60
-58
-56
-54
Latitude

GroupA Sea Ice Thickness

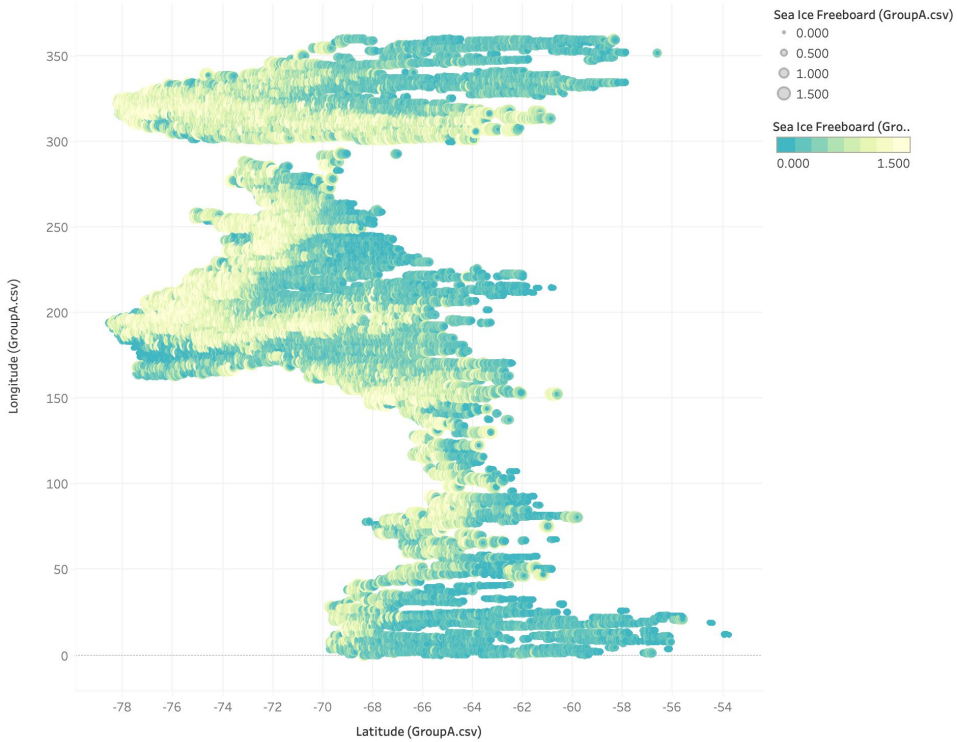


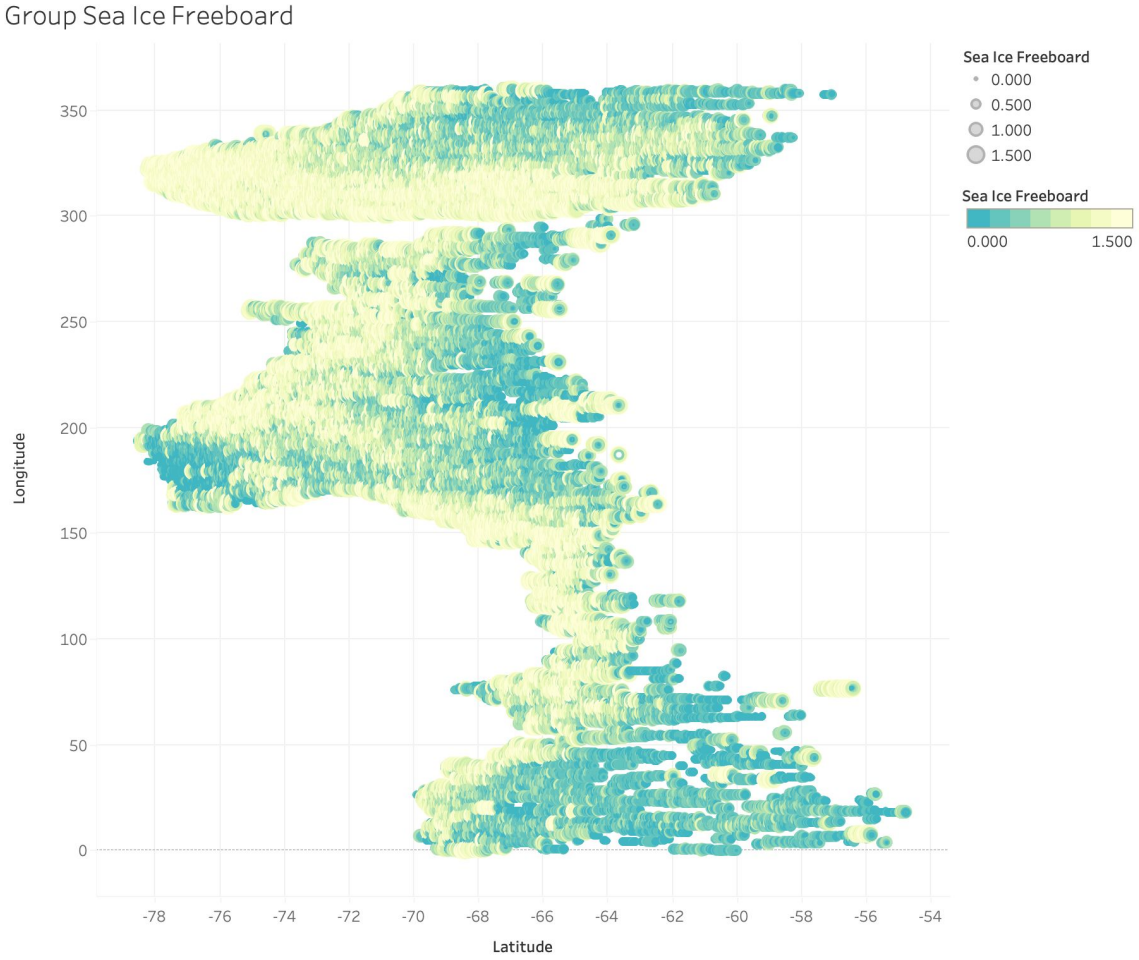
Sea Ice Freeboard

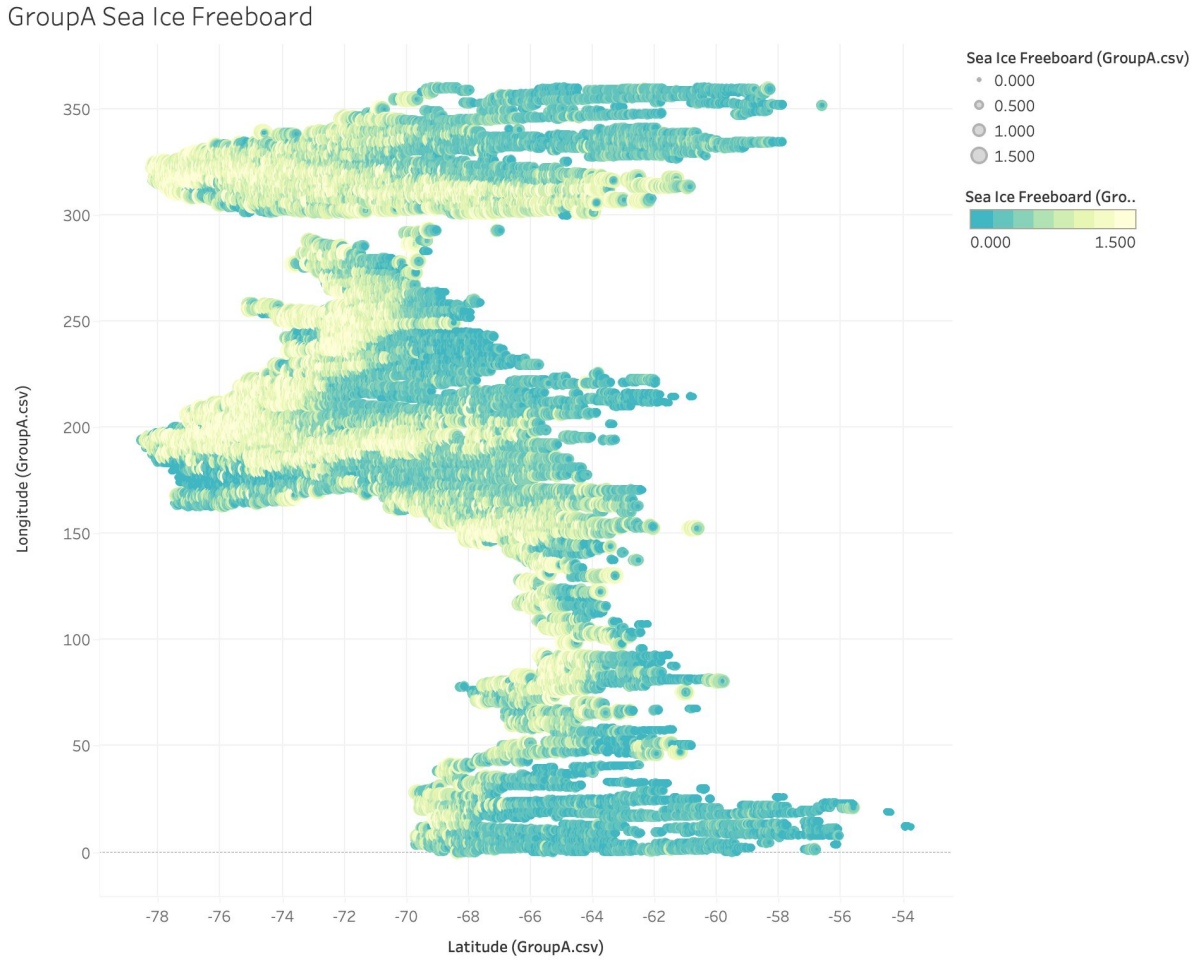
Group Sea Ice Freeboard



GroupA Sea Ice Freeboard




Group Sea Ice Freeboard
Sea Ice Freeboard
0.000
0.500
1.000
1.500
Sea Ice Freeboard
0.000
1.500
Longitude
350
300
250
200
150
100
50
0
-78
-76
-74
-72
-70
-68
-66
-64
-62
-60
-58
-56
-54
Latitude


GroupA Sea Ice Freeboard
Sea Ice Freeboard (GroupA.csv)
0.000
0.500
1.000
1.500
Sea Ice Freeboard (Gro..
0.000
1.500
Longitude (GroupA.csv)
350
300
250
200
150
100
50
0
-78
-76
-74
-72
-70
-68
-66
-64
-62
-60
-58
-56
-54
Latitude (GroupA.csv)

Machine Learning

I learned that we could with 99.4% accuracy predict the sea ice thickness. After seeing that I wondered if we could flip it and again with 99.8% accuracy we can predict sea ice freeboard.

What can we add?

If we were to use more data from other databases we would be able to get an even more accurate representation of the sea ice loss that we are experiencing. Using a database like the NSIDC GLIMS can give us a better picture of the sea ice loss.

Collected using a

Satellite

The data is collected by the Terra and LANDSAT series of satellites by the Advanced Spaceborne Thermal Emission and Reflection Radiometer

Data incompases the

Globe

The GLIMS spatial coverage is N: 90 S: -90 E: 180 W:-180

Years of data

172

GLIMS has data from 1850-present

NSIDC

The National Snow and Ice Data Center makes it easy for anyone to be able to look at the data. They are also very easy to get ahold of if you have any questions.

https://www.youtube.com/watch?v=8-KdH1DvtP8

Conclusion

Using the data we have we can easily see where the sea ice loss is greatest. Using that knowledge we can see what factors could be causing it. We can also accurately see what the sea ice loss could be in the future.

Questions